WHAT IS CLAIMED

1) A process for the preparation of polymer-grafted natural fibers comprising the following steps:

converting the hydroxyl groups on the natural fiber into the corresponding salified alcoholate groups;

grafting on the salified alcoholate groups a functionalized polyether containing a leaving group that favors nucleophilic substitution.

2) The process according to claim 1, wherein the step of converting the hydroxyl groups is preceded by a step of pre-treating the natural fibers by drying.

3) The process according to claim 2, wherein the step of pre-treating the fibers is carried out under vacuum at a temperature in the range of from 50°C to 100°C for a time of between 2 and 48 hours.

4) The process according to claim 1, wherein the step of converting the hydroxyl groups into salified alcoholate groups is done by adding the

pre-treated fiber to an anhydrous reagent solution in an inert atmosphere.

5) The process according to claim 4, wherein the anhydrous reagent solution comprises an alkaline reagent.

6) The process according to claim 5, wherein the reagent is potassium tert-butylate and 18-crown-6 ether in anhydrous tetrahydrofuran.

7) The process according to claim 5, wherein the reagent is sodium methylate in anhydrous methyl alcohol.

8) The process according to any of the foregoing claims, wherein the functionalized polyether has the general formula (I)

$$R[-O-X-]_m Y \quad (I)$$

where:

m is between 1 and 200;

R is an aliphatic or aliphatic/aromatic group;

Y is a functional leaving group;

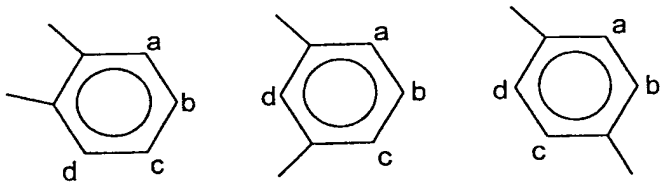
$$X = \left[\begin{array}{c} R_1 \\ | \\ -C- \\ | \\ R_2 \end{array} \right]_n$$

where

n is between 1 and 20;

R1 is the same as or different from R2 and is either hydrogen or a linear or branched aliphatic group;

or

X = 

having at the positions of the ring a), b), c) and d) one or more substituting groups which may be the same or different from each other and which may be a group comprising a halogen or a linear or branched C1-C4 alkyl.

9) The process according to claim 8, wherein the functionalized polyether of the general formula (I) is:

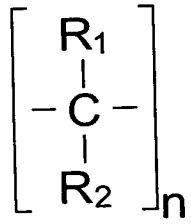
$$R[-O-X-]_m Y \quad (I)$$

where:

m is between 4 and 60;

R is hydrogen, a linear or branched C1-C4 alkyl group, or a benzyl group;

Y is iodine or mesyl;

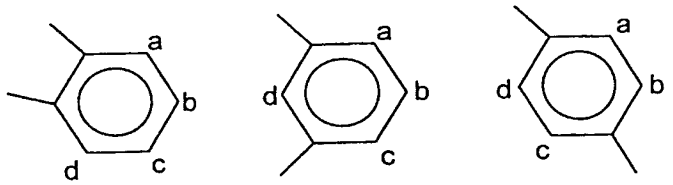
X = 

where

n is between 2 and 5;

R1 is the same as or different from R2 and is either hydrogen or a linear or branched alkyl group;

or

X = 

having at the positions of the ring a), b), c) and d) two substituting groups which may be the same or different from each other and which may be a group comprising chlorine, bromine and iodine or a linear or branched C1-C4 alkyl.

10) The process according to claim 8, wherein the polyether is polyoxyethylene, polyoxypropylene or polyethylene terephthalate.

11) The process according to claim 7, wherein the step of adding the reagent is followed by one or more steps of filtering and washing with anhydrous tetrahydrofuran.

12) A polymer-grafted natural fiber wherein the polymer is a polyether.

13) The grafted fiber according to claim 12, wherein the fiber is a cellulose fiber and the polyether graft has the general formula (I)

$$R[-O-X-]_m \qquad (I)$$

where:

m is between 1 and 200;

R is an aliphatic or aliphatic/aromatic group;

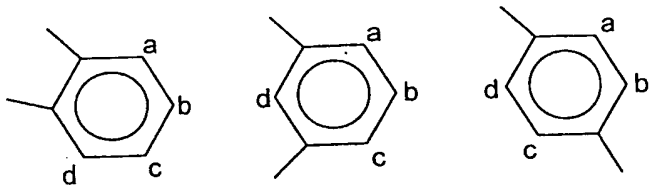
$$X = \left[\begin{array}{c} R_1 \\ | \\ -C- \\ | \\ R_2 \end{array} \right]_n$$

where

n is between 1 and 20;

R1 is the same as or different from R2 and is either hydrogen or a linear or branched aliphatic group;

or

X = 

having at the positions of the ring a), b), c) and d) one or more substituting groups which may be the same or different from each other and which may be a group comprising a halogen or a linear or branched C1-C4 alkyl.

14) A polymer-grafted natural fiber obtained using a process according to any of the foregoing claims from 1 to 11.

15) A composite material comprising polymer-grafted natural fibers, wherein the polymer is a polyether.

16) The composite material according to claim 15, wherein the natural fibers are grafted with a polyether of the general formula (I):

$$R[-O-X-]_m \qquad (I)$$

where:

m is between 1 and 200;

R is an aliphatic or aliphatic/aromatic group;

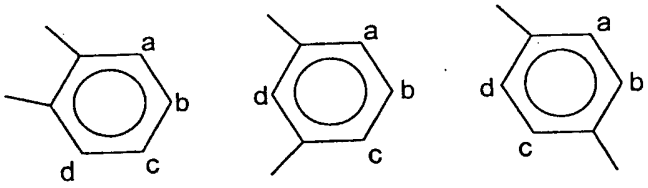
$$X = \left[\begin{array}{c} R_1 \\ | \\ -C- \\ | \\ R_2 \end{array} \right]_n$$

where

n is between 1 and 20;

R1 is the same as or different from R2 and is either hydrogen or a linear or branched aliphatic group;

or

X = 

having at the positions of the ring a), b), c) and d) one or more substituting groups which may be the same or different from each other and which may be a group comprising a halogen or a linear or branched C1-C4 alkyl.

17) The composite material using polymer-grafted natural fibers, wherein the natural fibers are grafted with polymers using the process according to one or more of the foregoing claims from 1 to 11.

18) Use of polyether-grafted natural fibers for the preparation of composite materials.

19) Use of polymer-grafted natural fibers for the preparation of composite materials, wherein the natural fibers are grafted according to one or more of the foregoing claims from 1 to 11.